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is, in fact, an arid climate. To me, of all the phenomena observed, those of the glaciers were of most interest, but I shall resist the temptation to dwell upon the many features of importance which they present. We are promised a full report on these glaciers by Professor DeGeer, who has studied and mapped them on his several expeditions.

Our little steamer left Ice Fiord under steam generated by Spitzbergen coal, and with it made its way to Norway. The islands are to-day a "No-Man's Land," but the presence there of extensive workable beds of coal in latitude 78° N. gives to this land, though far within the Arctic Zone, a new importance. Already, at the American coal mine, there is permanent settlement, and extensive development has been carried on. It was a wierd experience to find a "Longyear City" in this far northern land, to be conducted through a frozen coal mine by an American engineer, and to have a foreground of electric wires, and railway tracks with an ice cap background.

THE RUBBER WORKERS OF THE AMAZON

BY

A. LANGE.

In the State of Amazonas, excluding the City of Manaos, probably 150,000 men are directly occupied with the rubber trade. They are proprietors and workers. The proprietors, whether foreigners or Brazilians, have now adopted modern methods both in the working of the rubber and in its commercial manipulation. Not more than seven or eight years ago, the actual tapping of the rubber tree was conducted in such an unintelligent manner that enormous losses resulted through the killing of the trees. They are now tapped scientifically and the new method is enforced on all important rubber estates. Formerly the rubber was smoked with certain materials and in such a manner that the health of the operator was seriously affected after a few years' work. By the modern method no danger whatever is involved in the smoking process. Not only in the technical phases of rubber collecting but also on the business side of it they have improved their methods. They now, for example, employ expert bookkeepers, if not competent themselves in this line.

The proprietor living at a great distance from Manaos, often

suffers large losses through fluctuations in the rubber-market because the market quotations do not reach him for two to three months. Thus he may ship 10,000 to 15,000 pounds of rubber and, a month later, the news may come that a big drop in price has occurred. If he had known this he might have held his rubber for a rise in the market. The small river launches receive the news from the steamers of the Amazonian Steam Navigation Co., which ply on the main streams. In this way all information reaches the rubber districts of the upper Amazon.

An average rubber estate extends as a narrow band on both banks of the river and is often fifty to seventy-five miles long. It stretches two to three miles into the forest, but seldom more, as the rubber trees grow only near the river front. Along this narrow stretch of land the camps of the workers are distributed, the headquarters generally being located centrally so that the workers, living at the extremities, can cover the distance from their camp to headquarters in a day and a night. They travel, of course, by boat on the river.

It is the custom on some of the largest and best regulated rubber estates for the workers to assemble every Saturday night at the office, at headquarters, to report the amount of rubber collected and smoked during the week. The amount varies greatly. Many different factors influence the weekly output, such as the poor health of the worker or, as is often the case, his disinclination to work. Weather conditions also play an important rôle in the tapping of the milk. Few workers report a full week of labor. An average working week taken from the reports of eighty-seven men proved to be four days. One or two days with fever or some other disease, or two days with continuous rain and the average of four days is reached. In one camp I observed that the worker, who was a powerful Indian, had made some marks on a piece of board with a burnt stick. He informed me that every time he put in a day's work he made a mark. There were in all forty-eight marks. This was July 5, and he began work on January 1.

A launch comes up to this remote part of Brazil once a month with merchandise and returns down the river with rubber. Shortly before the arrival of the launch the manager makes a canoe journey from one end to the other of his estate and weighs the rubber pellets that are awaiting shipment in the camp of each worker. Then all the rubber is carried to headquarters and placed on the river bank ready for shipment.

The manager pays his workers 6,000 reis for each kilogram; in other words a dollar for each pound of smoked rubber, and sixty

cents for each pound of caoutchouc. The monthly amount collected from each rubber worker is then checked up in an account-book payable to the worker whenever he wants to leave the employ of the manager. However, another little item has to be straightened out before he can leave and that is the account of the merchandise he has purchased. It may be taken for granted that the proprietor is not losing anything. He always has a store in connection with his head-quarters. The employees are bound to buy from him, as there is no other store within a radius of a great many miles. Their daily supply of farinha, sugar, coffee, rice and beans, as well as their tools, rifles and ammunition, not to forget medicine and articles of clothing and luxury, all have to be purchased at this store and at prices that are absolutely staggering, though perhaps not so excessive if the locality is taken into consideration. I give here prices as now quoted in the store of Col. R. da Silva, whose estate is on the river Itecoahy, in the Javary region:

One box of sardines	$1.20
One pound of unrefined sugar	.30
One roll of tobacco (retails in Para for $4)	21.30
One basket of farinha (retails in Para for $4.50)	13.30
One bottle of ginger-ale	.60
One pound of potatoes	.60
The cheapest cloth with stamped pattern, per yard	.90
One Collins Machete (N. Y. price $1)	$8 to 10.00
One pair of men's shoes (N. Y. price $2.50)	11.60
One bottle of very plain port wine, 22,000 reis	7.30

Outside of the store is a sign, saying that any employee who owes the house more than 4,000,000 reis ($1200), cannot make purchases exceeding 1,000,000 reis, that is, $300 per month.

The question of debt is by no means an unimportant one to the rubber worker. When he gets employment as a worker on an estate, he is called "Brabo," which means that he is "wild" or unacquainted with the estate and its many estradas. He is, therefore, put in charge of a small estrada, very likely one that nobody else wants, because it gives little or very poor milk. He will probably collect one pound of rubber milk a day and will undoubtedly consume in material and supplies about $4 to $5 a day, so that after three or four months he owes the boss $400 to $500. Very likely, for the rest of the year he will keep abreast of expenses, barely managing, by working from 4 in the morning to 6 at night, in all kinds of weather, to earn as much as he eats and uses. The next year he may have the misfortune to fall sick so that he cannot work for a half year; his debt will then have run up to about $1,000. How-

ever, the manager keeps him as he knows that the "Brabo" will get well some day and work off his debt. If he dies, then his debt is put in the "loss" column, after the profit on the purchased merchandise has been subtracted. Some very industrious workers, good rifle-shots and handy with bow and arrow in shooting fish, often manage to save considerable money, a few years giving them an account of $3,000 to $4,000. They will then leave the service and descend the river to Manaos, where they live as "gentlemen of leisure." Nothing less than champagne and the swellest hotel are good enough for them. These men, who have spent all their lives working in the forests doing the hardest and most trying kind of work, will now in three or four weeks spend several years' earnings, barely leaving them enough to buy a steerage ticket back to the woods.

Here are a few figures which will throw some light on the profits and expenses connected with the running of an average rubber estate. I have chosen the estate of Col. R. da Silva as, in size and output, it may be called representative. The annual output is about 100,000 pounds of rubber. Allowing for fluctuations, the sales amount to $200,000 and the wages paid to employees to $60,000. The store connected with this establishment is supplied from wholesale dealers at an annual cost of $33,000, yielding, in reselling to the workmen a net profit of $24.750 gold. The total net profit of the house is $164,750.

The demarcation, by a Government engineer, of the estate is remarkably expensive and has to be paid the first year. In this case it amounted to $78,000. The annual taxes are: government, $18; municipal, $60; state, $150.

THE ECONOMIC IMPORTANCE OF THE PLATEAUS IN TROPIC AMERICA*

BY

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University of Pennsylvania

The mathematical limits of the Torrid Zone cause the tropic regions to receive much undue credit, because high altitude extends the Temperate Zone in the form of mountain and plateau islands which

* This suggestive paper, read before the Eighth International Geographical Congress, in 1904, and published in its *Proceedings*, has been revised and expanded by Prof. Smith for the *Bulletin*. It is printed here in the belief that its facts and opinions are of timely interest in view of the rapidly growing attention to tropical America.—THE EDITOR.